May 30, 2002

Memorandum

From: Larry Turner, Ph. D. **|signed|**
Environmental Field Branch
Field and External Affairs Division

To: Arthur-Jean Williams, Chief
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Subject: Effects Determination for Alachlor for Pacific Anadromous Salmonids

I reviewed data and other information for alachlor and its potential effects on Pacific anadromous salmonids and their critical habitat. This pesticide does not seem to warrant action under the Endangered Species Act because I conclude that it will cause 'no effect' on the listed Pacific salmon and steelhead and their critical habitat.

Under section 7 of the Endangered Species Act, the Office of Pesticide Programs (OPP) is required to consult on actions that 'may affect' listed species or that may adversely modify designated critical habitat. Situations where a pesticide may affect a fish, such as any of the salmonid species listed by the National Marine Fisheries Service, include either direct or indirect effects on the fish. Direct effects result from exposure to a pesticide at levels that may cause harm.

Relevant acute data are derived from toxicity tests with lethality as the primary endpoint. The standardized acute tests for pesticide registration include analysis of observable sublethal effects as well. Typically, a standard fish acute test will include concentrations that cause no mortality, and often no observable sublethal effects, as well as concentrations that would cause 100% mortality. By looking at the effects at various test concentrations, one can statistically predict the effects likely to occur at various pesticide concentrations. A well done test can even be extrapolated to concentrations below those tested or above the test concentrations if the highest concentration did not produce 100% mortality.

OPP evaluates the potential chronic effects of a pesticide on the basis of several types of tests. These tests are often required, but not always. If a pesticide has essentially no acute toxicity at relevant concentrations, or if it degrades very rapidly in water, or if the nature of the use is such that the pesticide will not reach water, then chronic fish tests may not be required. Chronic fish tests primarily evaluate the potential for reproductive effects and effects on the offspring. Other observed sublethal effects are also required to be reported. An abbreviated chronic test, the fish early-life stage test, is usually the first chronic test conducted and will indicate the likelihood of

reproductive or chronic effects at relevant concentrations. If such effects are found, then a full fish life-cycle test will be conducted. If the nature of the chemical is such that reproductive effects are expected, the abbreviated test may be skipped in favor of the full life-cycle test. These chronic tests are designed to determine a "no observed effect level" (NOEL) and a "lowest observed effect level" (LOEL).

An analysis of toxicity, whether acute or chronic, must be combined with an analysis of how much will be in the water, for fish. Risk is a combination of exposure and toxicity. Even a very highly toxic chemical will not pose a risk if there is no exposure, or very minimal exposure relative to the toxicity. OPP uses a variety of chemical fate and transport data to develop "estimated environmental concentrations" (EECs) from a suite of established models. The acute or chronic EEC is compared with the acute or chronic (respectively) toxicity to determine if there is risk. Generous safety margins are used for both acute risk and for chronic risk in rivers and streams. For ponds, there is still a safety margin for chronic risk, but it is not as "generous". While our risk assessment criteria (levels of concern) are intended to protect populations of non-target species that are not listed as endangered or threatened, our criteria for endangered and threatened species are intended to protect individuals of these species.

We also attempt to protect listed species from indirect effects of pesticides. We note that there is not a clear distinction between indirect effects on a listed species and adverse modification of critical habitat (discussed below). By considering indirect effects first, we can provide appropriate protection to listed species even where critical habitat has not been designated. In the case of fish, the indirect concerns are for food and cover. In general, pesticides, including most herbicides, applied in terrestrial environments will not reach aquatic environments in sufficient amounts to affect the plant material in the water that provides aquatic cover for listed fish. Thus the primary indirect effect of concern would be for the food source for listed fish. However, it is not necessary to protect individual organisms that serve as food for listed fish. Thus, our goal is to ensure that pesticides will not impair populations of these food organisms. For fish, this is primarily aquatic invertebrates, although aquatic plants may be relevant food for some fish species. We already are protecting food fish at the individual level because we are protecting the listed fish at the individual level, so there is nothing extra we need to do to ensure an adequate supply of fish for food of listed fish. As you know, comparative toxicology has demonstrated that various species of scaled fish generally have equivalent sensitivity, within an order of magnitude, to other species of scaled fish tested under the same conditions.

OPP is also required to consult if a pesticide may adversely modify designated critical habitat. We consider that the use of pesticides on land could have such an effect in a few circumstances. For example, use of herbicides in riparian areas could affect riparian vegetation, especially woody riparian vegetation, which possibly could be an indirect effect on a listed fish. However, there are very few pesticides that are registered for use on riparian vegetation, and the specific uses that may be of concern have to be analyzed on a pesticide by pesticide basis. In considering the general effects that could occur and that could be a problem for listed salmonids, the primary concern would be for the destruction of vegetation near the stream, particularly vegetation that provides cover or temperature control, or that contributes woody debris to the aquatic environment. Destruction of low growing herbaceous material would be a concern if that destruction resulted in excessive sediment loads getting into the stream, but such increased

sediment loads are insignificant from cultivated fields relative to those resulting from the initial cultivation itself. Increased sediment loads from destruction of vegetation could be a concern for uncultivated areas. Any increased pesticide load as a result of destruction of terrestrial herbaceous vegetation would be considered a direct effect and would be addressed through the modeling of estimated environmental concentrations. Such modeling can and does take into account the presence and nature of riparian vegetation on pesticide transport to a body of water.

As you are aware, all of our risk assessment procedures, toxicity test methods, and EEC models have been subject to public comments and have been peer-reviewed by OPP's Science Advisory Panel.

Given these considerations, I have evaluated the potential effects of this pesticide on threatened and endangered species. Most of the information used in the assessment below is derived from the Reregistration Eligibility Document (RED) for alachlor issued September 1998[1]. Typically, a RED will indicate if there are risks of concern, i.e., exposure that exceeds a "level of concern" (LOC), where there is one level of concern for "high risk", a second as a trigger for "restricted use classification", and a third, more sensitive level of concern for threatened and endangered species. Of course, this RED, like REDs generally, addresses all kinds of species groups, but does not deal with particular species; I have attempted to apply the more general findings of the RED to the specific listed salmonids.

The alachlor RED states (p176) "For freshwater animals (fish or invertebrates) exposure estimates based on Tier I modeling (GENEEC) exceed LOCs (levels of concern) only for chronic effects, and only at application rates of 4 lb ai/A (invertebrates) without incorporation." The aquatic exposure levels were not of enough concern to use the higher tier EEC model. The RED also stated, "Alachlor concentration levels observed in monitoring studies do not indicate a risk for acute or chronic effects on aquatic animals. Thus, while a chronic risk cannot be dismissed for small, shallow, relatively static bodies of water (such as farm ponds or small freshwater marshes) from unincorporated applications of alachlor at 4 lbs ai/A (invertebrates), the information available suggests that impacts are not expected in larger water bodies such as rivers or large lakes."

The data and analyses clearly indicate no concern for fish. Screening level EEC models indicate a very slight concern for aquatic invertebrate chronic effects for those invertebrates that occur in ponds and other static waters. Such concerns would not exist in flowing waters or larger bodies of water to the extent that any effects would impair the food supply for the listed salmon and steelhead. The statement that concentrations observed in monitoring studies are not of concern refers to high use areas of alachlor in the midwestern U. S. In the USGS monitoring studies for the San Joaquin-Tulare Basin[2], the Willamette Basin[3], or the Central Columbia Plateau[4], maximum observed concentrations are only about one-third the levels that prompted the "do not indicate a risk" statement. Therefore, I conclude that there is no effect from the labeled use of alachlor on listed Pacific salmon and steelhead.

The primary use of alachlor is on field corn, with soybeans and sorghum the next highest usage[5]. As of February, 2002, the only other uses are for sweet corn, beans, peanuts, and a few ornamental trees. Moderate use occurs on beans in Idaho and California. Alachlor is effective

against grasses and herbaceous weeds. There is no indication that woody plants would be adversely affected; indeed, the use on woody ornamental plants suggests that woody plants would not be affected. The effect on riparian vegetation critical to salmonids is negligible or none. Therefore, I conclude that the labeled use of alachlor will not adversely modify critical habitat of listed Pacific salmon and steelhead.

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1. Reregistration Eligibility Decision - Alachlor. Office of Pesticides and Toxic Substances, U. S. Environmental Protection Agency, EPA 738-R-98-020, September, 1998.

2. Dubrovsky NM, Kratzer CR, Brown LR, Gronberg JM, Burow KR. 1998. Water Quality in the San Joaquin-Tulare Basins, California, 1992-95. U.S. Geological Survey Circular 1159.

3. Wentz DA, Bonn BA, Carpenter KD, Hinkle SR, Janet ML, Rinella FA, Uhrich MA, Waite IR, Laenen A, Bencala KE. Water Quality in the Willamette Basin, Oregon, 1991-95. U.S. Geological Survey Circular 1161.

4. Williamson AK, Munn MD, Ryker SJ, Wagner RJ, Ebbert JC, Vanderpool AM. 1998. Water Quality in the Central Columbia Plateau, Washington and Idaho, 1992-95. U.S. Geological Survey Circular 1144.

5. USGS, National Water Quality Assessment, Pesticide National Synthesis Project, at http://ca.water.usgs.gov/use92/alachlor.html